

XIII. SOME NOTES ON SPHÆRIIDÆ WITH DESCRIPTIONS OF NEW SPECIES.

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Among the Sphæriidæ examined by me during the year 1919 there were an unusual number of forms possessing interest in regard to their systematic position and distribution, and there are also some new species and forms.

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At the Biological Station of the University of Michigan, on Devils Lake, North Dakota, as headquarters, Miss Mina L. Winslow, of the Museum of Zoölogy, and other collectors have secured some good material, which they sent me for examination. It mainly consists of *Sphæriidæ*, *Vallonia*, and *Pupillidæ*. I mention some of their sendings in the following paragraphs.

1. Vicinity of Devils Lake, North Dakota: *Pisidium tenuissimum* Sterki, a very small form from several unnamed lakes, and from Court Lake; *P. tenuissimum calcareum*, a form frequent to common, occurring fossil in the marls of Maine, Michigan, and Illinois, but now for the first time represented by recent specimens; a few specimens of *P. vesicularæ*, a small form from the same localities.

2. Turtle Mountains, North Dakota, from which nothing had been before this reported: *P. variabile*, *pauperculum*, *contortum* Prime, the last mentioned not before seen from west of Michigan; *P. apiculatum* n. sp. (see *infra*, Description No. 7); and an exceptionally small form of *P. compressum* Prime.

3. There are six separate lots taken from the Sheyenne River at various places. Of particular interest are *Sphærium declivæ* n. sp. (see *infra*, Description No. 12); *S. sulcatum* Lamarck, the same form as from South Dakota; a few valves of a small *Sphærium*, apparently *stamineum* Conrad, which call for more specimens for their exact determination; *Musculium jayense* Prime. Most of the specimens

<sup>1</sup> This paper is part of a report submitted to the Director of the Carnegie Museum about the beginning of the year 1920.

are recognizable, though rather small. A number are more or less deformed and crippled, though probably the same; a few are markedly different, and are apparently *S. truncatum* Linsley.

4. Sent with the preceding from the vicinity of Lake Cushman, Mason County, Washington, collected by Mrs. Helen T. Gaige, are some *Sphæriidæ* of particular interest. I shall first mention *Sphærium patella* Gould from several localities. The original description of this species, as cited by Prime in *Mon. Corb.*, p. 42. is evidently based upon quite immature specimens: long. 10.75; lat. (= alt.) 7.75; diam. 4.5 mm. Those before me range from smaller sizes, than those just given, to specimens 15 to 16 mm. long, and still larger individuals have been seen before from other places. *Pisidium variabile* Prime, apparently like eastern forms, and markedly different from the form *magnum* from other places in Washington. For *P. notophthalmi* n. sp., (see *infra*, Description No. 8). *P. columbianum* Sterki was sent, an exceptionally small form and otherwise somewhat different, having the beaks markedly flattened on top.

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Included in a sending received from Dr. Bryant Walker was a lot of shells from the beach-drift of Saginaw Bay, Lake Huron, collected by Mr. Calvin Goodrich, including several forms of *Sphærium* spp., which furnish valuable aid in studying the *Sphæria* of the Great Lakes. Among them are several peculiar forms, which can not be identified with those now known. More good material from all of the Great Lakes, especially material taken by dredging, is very desirable. In the lot were numerous specimens, mostly young and immature, identified as *P. amnicum* (form *striolatum* Baudon ?) from Lake Ontario, supposed to have been introduced from Europe. One young shell of the same form has also been seen from beach-drift at the southern end of Lake Michigan. This may reopen the question whether the species is indigenous in North America. So far as is known it has not been found fossil on this continent. If the mussels were colonized in Lake Ontario, they may well have spread to the upper lakes. It may be added that repeated careful comparison has shown that the mussel from Lake Ontario is identical with specimens from England, France, and Germany, while other forms of *amnicum* are rather different.

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Mr. S. Stillman Berry has sent a number of lots collected by him in 1919 and in former years. One rather remarkable lot is from Lake Winnecook, Unity, Maine, collected in 1909. It surprised me to receive from a locality in New England a faunula comprising peculiar forms of known species and quite a number of new species. I refer at the outset in what follows to the material sent me by Mr. Berry from his collections made in Maine.

*P. aquilaterale* Prime, differing from most other forms by the less elevated beaks and generally more rounded outlines; *P. pauperculum nylanderii* Sterki, somewhat different from the same from other places in New England (over three hundred specimens); *P. ferrugineum* Prime, less inflated than the usual form and with the ridges on the beaks strongly developed. (For *P. deflexum*, *compressum mutatum*, *decisum*, *paradoxum*, and *griseolum*, n. spp., and forms, consult *infra*, Descriptions Nos. 1-5.) It must be regarded as even more remarkable that among the five hundred specimens sent me there were none of the many species known to occur in New England, some even in the same part of Maine, with the exception of the three mentioned above at the beginning of this paragraph. There were no specimens of *P. compressum*, typical, and the New England form *curvatum*, *variabile*, *sphericum*, *abditum*, *splendidulum*, *rotundatum*, *ventricosum*, and a dozen others. It certainly would be worth while to thoroughly explore that whole vicinity in order to determine the ecological and systematic significance of its fauna. Some interesting forms of *Musculium* and *Sphærium* should also be found there.

Mr. Berry also sent me some material collected near Iceberg Lake, Glacier National Park, Montana, in the year 1910. A few specimens appear to be identical with *P. marci* Sterki from Utah. I describe as new a species collected by Mr. Berry in Elk Creek, Meagher County, Montana, in the year 1914, *P. limpidum* Sterki (see *infra*, Description No. 6).

From the same correspondent I received a number of lots of *Pisidia* collected in southern California, mainly in the San Bernardino Mountains, during the years 1908-1919. In order to their exact determination closer examination and comparison is necessary.

In the same sending there were a number of *Pisidia* collected by A. W. Hanham at Quamishan, British Columbia, among them *P. columbianum* Sterki. Two species from this locality I have described

as new, *P. prognathum* and *P. pilula* (see *infra*, Descriptions Nos. 10-11).

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In 1918 and 1919 Mr. Carl C. Engberg, of Lincoln, Nebraska, collected some *Pisidia* on Orcas Island, San Juan County, Washington. Among the several species and forms it may be noted that *P. abortivum exiguum* Sterki was found at several places, and seems to be common and even abundant, but not a single typical *P. abortivum* was collected, while in the Bitter Root Valley, Montana, the latter were predominant, only a few of the form *exiguum* occurring. The mussels have regular, elliptic outlines, and are strongly inflated, globular, rather variable in size (from 2.2 to 1.6 mm. long when full grown), and with nepionic young. It appears that this smaller form is distributed all along the Pacific Slope, and it may be the really typical form, and the larger, less inflated form, possessing somewhat different outlines (*abortivum*) may be specially developed.

I have described as new one of the species collected by Mr. Engberg, calling it *P. orcascense* (see *infra*, Description No. 9).

In the same lot were some other specimens, which may possibly represent undescribed species, but there is not enough material at hand to seem to justify their description as new. It may be proper to state that with this material there was a single minute *Musculium*, 2.6 mm. long, nearly globular, but apparently immature.

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With other material, Dr. Frank C. Baker has sent two specimens, labeled "Alaska." One of them was *P. idahoense* Roper, much like the large form from Seattle, Washington, 10 mm. long, with six or seven strongly marked rest-lines. Other specimens of so-called *idahoense* from localities in Alaska are markedly different, more like the form *indianense*, and it is possible that the two forms represent distinct species, as has been suggested by some malacologists. The other specimen sent by Mr. Baker was *Sphaerium tenue* Prime, well formed, 6.2 mm. long.

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Other correspondents in the western parts of the country have made collections and sent in specimens, which demand further careful study

and comparison before reporting upon them. It is worthy of observation that the Pacific region from Alaska and British Columbia to southern California is remarkably rich in Sphæriidæ, most of them being different from the eastern species. Every sending from the western coast reveals new forms. The fauna as a whole is still insufficiently and only fragmentarily known. Some of the species appear to be so variable that it is difficult to define them. In consequence I am in doubt whether some of them represent local forms, regional subspecies, or distinct species. I may add that there are in my hands some manifestly new and distinct species, which are not, however, represented by sufficient numbers of specimens to justify me in publishing them as such for the present. This fact may mean disappointment to the collector who has sent in his specimens and requests that they be "named." Nevertheless every good lot of specimens from the Pacific coast, or, for that matter, from any locality whatsoever, means a contribution to the understanding of the interrelations of the species and forms of this intricate group of the Pelecypoda, their variation, and their geographical distribution.

DESCRIPTIONS OF NEW SPECIES AND FORMS OF PISIDIUM AND  
SPHÆRUM.

1. *Pisidium deflexum* n. sp. Mussel inequipartite, oblique, well inflated, anterior part markedly larger and directed downward, the superior and inferior margins being at an angle; superior margin slightly curved and merging into the anterior in a rather long continuous curve as far as the rounded anterior end, which is well below the median line; posterior margin truncate or subtruncate obliquely anteriorly, forming a well-marked angle with the superior, passing into the inferior margin without an angle; beaks rather posterior, broad, rounded, or slightly flattened, not greatly projecting over the dorsal margin; surface dull glossy, with fine, somewhat sharp and irregular striæ and a number of rest-lines; color grayish to yellowish corneous, alternating with narrow dark zones, mostly along the rest-lines; shell rather thick, opaque; hinge stout, somewhat like that of *compressum*, but the plate is longer and the laminae, especially the anterior, diverging at smaller and more rounded angles; the right cardinal is less sharply curved, with a deep excavation below. Long. 3.5; alt. 3; diam. 2.3 mm.

*Habitat*: Lake Winnecook, Unity, Maine. Collected by S. Stillman Berry in 1909. There were eighteen specimens in the lot, from young to mature; in size and appearance much like *compressum mutatum*, with which it is associated, but the two are plainly separable.

Type No. 9212, C. M.; paratypes in the collection of Mr. S. Stillman Berry.

2. *Pisidium compressum mutatum* n. subsp. The superior margin is comparatively long and slightly curved, the supero-anterior slope steep, long, straight or nearly so; the beaks are less elevate, broader, with low, but sharp, ridges almost entirely surrounding a rather large flattened central area on each; surface with a somewhat silky gloss produced by very fine, crowded, sharp, irregular striæ; color grayish to plumbeous; shell subtranslucent; hinge stout, of the general configuration of the species, the plate rather longer; mussel rather small. Long. 3.2; alt. 3; diam. 2 mm.

*Habitat*: Lake Winnecook, Unity, Maine. Collected by S. Stillman Berry in 1909. Specimens ranging from young to mature (see notes under the preceding species). Type No. 9211, C. M.; paratypes in the collection of Mr. S. Stillman Berry.

This *Pisidium* is markedly different from all of over a dozen named and described forms and subspecies of *compressum*, including those seen from New England and New York. If no intermediate and connecting forms are found, it should be regarded as a distinct species.

3. *Pisidium decisum* n. sp. Mussel subequipartite, short, slightly oblique, well inflated, mostly so above the middle; superior margin rounded, supero-anterior slope well marked, rather steep, straight, anterior end rounded angular, well below the median line, posterior margin truncate at right angles, inferior well curved; beaks slightly posterior, large, rounded, somewhat projecting over the hinge-margin; surface polished, with very fine and slight concentric striæ, some spaces smooth, with very fine scratch-like lines; color corneous to drab to olive, with a lighter zone along the margins, light to dark brown in old specimens; shell rather thick, translucent to opaque; hinge stout, rather long, plate broad, short, with the cardinals on its upper part, the right not much projecting, sharply curved in the middle, its anterior part short, the posterior long, grooved to bifid; left anterior somewhat oblique, angular, bent upward, its free edge sharply rounded or pointed, the posterior long, oblique, slightly

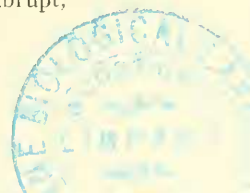
curved; laminæ at marked angles to the plate, massive, the right inner both with their cusps about in the middle, obtusely angular, not abrupt; outer anterior nearly half as long, the posterior less than one-third as long as the inner, left both with their cusps markedly larger, pointed, somewhat more abrupt; ligament short, thick. Long. 3.5; alt. 3.4; diam. 2.6 mm. Long. 2.8; alt. 2.8; diam. 2 mm. (apparently mature).

*Habitat*: Lake Winnecook, Unity, Maine. Collected by S. Stillman Berry in 1909. There were twenty-two specimens in the lot, ranging from young to old, and remarkably uniform, except that in a few old ones the supero-anterior slope and the posterior margin are slightly curved.

In shape and appearance the mussels somewhat resemble *P. variable*, especially immature examples of the form *cicer*, but are much smaller and easily distinguished; the young are of a different shape from those of *variable*.

Types No. 9214, C. M.; paratypes in the collection of Mr. S. Stillman Berry.

4. *Pisidium paradoxum* n. sp. Mussel of medium size, somewhat inequipartite and oblique, moderately elongate, moderately inflated, having somewhat oval outlines; superior margin nearly straight, bounded by slightly marked angles anteriorly and posteriorly, the other margins rounded, the supero-anterior slope barely marked in the adult, somewhat more so in the young; beaks slightly posterior, rather small, moderately projecting, rounded; surface with a somewhat silky gloss, striæ irregular, crowded, very fine, sharp, some of them with the periostracum slightly projecting, scale-like; color uniformly pale corneous to drab; shell very thin, subtranslucent; hinge slight, plate narrow; right cardinal with its anterior part nearly straight and longitudinal, close to the valve-margin, thin, the posterior part abruptly bent down, short, strongly bifid, the anterior (or inner) shank forming a hook, the posterior standing out somewhat wing-like; left cardinals small and short, far apart posteriorly, the anterior nearly straight and longitudinal, the posterior oblique; laminæ rather slight, the inner of the right valve with the cusps small, pointed, about median, the outer anterior placed proximally, about one-fourth the length of the inner, the posterior nearly half as long as the inner, both left laminæ with the cusps small, pointed, the anterior abrupt,



the posterior distally more so; ligament moderately long, slight. Long. 4; alt. 3.5; diam. 2.5 mm. Soft parts not examined.

The young mussels are very little inflated, with the small, narrow beaks projecting, the shells colorless, glassy, transparent; the right cardinal is slightly curved, and its posterior end little thicker, but distinctly bifid.

*Habitat*: Lake Winnecook, Unity, Maine. Collected by S. Stillman Berry, Aug., 1909. About forty specimens were seen, only a few of them mature, or nearly so.

Type and paratypes No. 9215, and seqq., C. M.; paratypes in the collection of Mr. S. Stillman Berry.

This is a rather remarkable species. In spite of its commonplace appearance, it is so different from others, especially in regard to the formation of the cardinals, that it is difficult to assign it to any of the more or less well-established groups. In fact, the right cardinal is rather like that of forms of *Musculium*, but otherwise the mussel is a true *Pisidium*. It should be noted that the configuration of the hinge was the same in two specimens opened; so it is not a case of individual deformity.

5. *Pisidium griseolum* n. sp. Mussel small, subequipartite, slightly elongate, moderately inflated; superior margin nearly straight, bounded by an angle posteriorly and a more obtuse angle anteriorly; supero-anterior slope somewhat marked, moderately oblique; posterior margin truncate or subtruncate at nearly right angles, inferior moderately curved; beaks barely behind the middle, rather small, rounded, or slightly flattened on top, not very prominent; surface dull glossy, with very fine, somewhat irregular striæ; color pale corneous to light grayish; shell thin, translucent; hinge rather long and stout, plate rather broad; cardinals short, rather well up on the plate, the right angular in the middle, its posterior part thicker and grooved, left both of about the same size, the anterior angular, its edge sharply pointed, posterior oblique, slightly curved; laminae somewhat massive, the right anterior with its cusp about median, pointed, not abrupt, posterior with cusp somewhat distal, abrupt distally, outer both rather large, about half as long as their principals; left both with cusps about median, pointed, not very abrupt; ligament rather short and thick. Long. 2.8; alt. 2.3; diam. 1.5 mm.

*Habitat*: Lake Winnecook, Unity, Maine. Collected by S. Still-



man Berry, July, 1909. About thirty specimens were in the lot, ranging from young to mature. Types No. 9218, C. M.; paratypes in the collection of Mr. S. Stillman Berry.

This modest and rather inconspicuous *Pisidium* can not be referred to any of the described species, and can not be mistaken for another. Similar specimens have been seen before and set aside with a query—*c. g.*, some from Lynnfield, Massachusetts, collected by H. W. Winkley in 1910, C. M., No. 6645. The color of these is yellowish corneous, and the hinge is slightly different.

6. *Pisidium limpidum* n. sp. Mussel small, subequipartite, short and oblique, moderately inflated; superior margin short, rounded, supero-anterior slope from closely in front of the beaks, somewhat curved, rather steep and long as far as the rounded angular anterior end well below the longitudinal axis; posterior end truncate at right angles, passing into the regularly curved inferior margin without an angle; beaks little projecting over the hinge-margin, slightly flattened laterally near the center, so as to appear almost pointed and closely approximate in frontal (or rear) view; surface polished, with the concentric striæ very slight, irregular; shell glassy transparent, colorless when fresh, with a faint yellowish tinge when dry, and a whitish zone along the margins; hinge rather stout, curved-angular, plate short, rather broad; right cardinal long, longitudinal, moderately curved in the middle, its posterior end somewhat thicker and slightly grooved to bifid; the left ones rather small, slight, the anterior nearly straight, its edge pointed, the posterior oblique, slightly curved; laminae stout, their cusps about in the middle, obtusely pointed, not abrupt; outer ones about one-third the length of the inner, rather thick; left ones with their cusps about in the middle, large, pointed, not very abrupt; ligament rather short and thick. Long. 2.5; alt. 2.3; diam. 1.8 mm.

*Habitat*: Elk Creek, one mile south of Oxford Station, Meagher Co., Montana. Collected by S. Stillman Berry, June, 1914. There were over forty specimens in the lot, most of them gravid. They somewhat resemble forms of *pauperculum*, but are distinct, differing especially in the features of the hinge.

Type and additional specimens in C. M., No. 9198 and seqq.; paratypes in the collection of Mr. S. Stillman Berry.

7. *Pisidium apiculatum* n. sp. Mussel inequipartite, oblique, well

to strongly inflated; upper margin short, curved, bounded by an obtuse angle to the supero-anterior slope, which is straight or nearly so, anterior end rounded angular, posterior margin well rounded, forming one continuous curve from the beaks to the anterior end, the inferior margin somewhat less strongly curved; beaks somewhat behind the middle, narrow, almost pointed, projecting well over the hinge margin; surface polished, with very slight, somewhat irregular striæ, and one or two rest-lines; color whitish to straw, with a few narrow alternating narrow zones which are glassy transparent; hinge short, little over one-half the length of the mussel, curved, moderately stout; plate somewhat broad; cardinals small, slight, high up on the plate, the right moderately curved or nearly straight, its posterior part a little thicker, grooved to somewhat bifid; the left both slightly curved, of nearly equal lengths, or the posterior somewhat larger; laminae short, in the right valve the inner both with cusps occupying their entire length, pointed, bent upward, the anterior especially so, and markedly concave on its upper face, somewhat spoon-shaped, the outer ones both small and short; in the left valve both with cusps very abrupt, almost spine-like; ligament rather short and moderately thick. Long. 4.2; alt. 3.7; diam. 3.4 mm.; long. 4.2; alt. 3.6; diam. 2.8 mm.

Soft parts colorless or light yellowish (in preserving fluid). Almost every specimen, even barely half-grown, contains a number of nepionic young.

*Habitat*: Upsilon Lake, Turtle Mountains, North Dakota, in mud and sand, water about one foot deep. Collected by Mina L. Winslow, July 15, 1919. Type C. M. No. 9160 and seq.; paratypes in the Museum of Zoölogy, University of Michigan.

This *Pisidium* is so characteristic and so greatly different from others that there can be no question about its representing a distinct species, apparently not seen or noticed before. Probably it is of northern distribution. The specimens, several score, ranging from quite young to full-grown, are remarkably uniform, in regard to size, shape, and color. However, a few have a small, but well-marked, sharp scutellar angle at the junction of the upper margin and the supero-anterior slope, as frequently seen in some other forms—*c. g.*, *scutellatum*, *sargentii*, *ovum*, and typical *elevatum*.

8. *Pisidium notophthalmi* n. sp. Mussel minute, elongate, subequi-

partite, little oblique, moderately inflated; outlines nearly elliptical, with the superior margin rather long, nearly straight, the supero-anterior slope slightly marked, the posterior margin rounded or subtruncate, inferior moderately curved; beaks slightly behind the middle, rather small, rounded, not much projecting over the hinge-margin; surface shining, with very fine, slight irregular striæ almost obsolete over the beaks; color whitish, apparently bleached, and probably glassy colorless when fresh; shell thin, hinge rather long, slight, plate very narrow; cardinals small, the right slightly curved, its posterior part projecting cusp-like, somewhat thicker and slightly grooved, the left both short, nearly parallel, the anterior close to the hinge-edge, somewhat pointed; laminae slight, the inner of the right valve with their cusps somewhat pointed and abrupt, the outer ones long, one-half to three-fourths the length of the outer, the anterior with a small, pointed, distal cusp; the left ones with their cusps distal, pointed, abrupt; ligament rather short, slight, but occupying nearly the whole thickness of the plate. Long. 2.3, alt. 1.8, diam. 1.3 mm.; long. 2, alt. 1.5, diam. 1.3 mm. (apparently mature).

*Habitat*: Wild Cat Lake, Skokomish Valley, Mason County, Washington. Collected by Mrs. Helen T. Gaige in 1919, and sent for examination by Miss M. L. Winslow. The specimens were taken from the digestive tract of a salamander, *Notophthalmus torosus*, and are all "dead shells," bleached, mostly valves, but a large part otherwise in good condition, with the periostracum and the hinges intact. The mussels were evidently abundant at the place; of nearly three hundred, all, except one, a young shell of *Pisidium* sp. ?, were of this same species, from nepionic young, some still in the parents, to apparently full-grown, or nearly so, and fairly uniform. The hinges show some variation: in some specimens the outer laminae of the right valve are rather short; and in some the cardinals of the left valve are more oblique; and occasionally the posterior is rudimentary.

The only *Pisidium*, which *P. notophthalmi* resembles, is *tenuissimum* (exceptionally small forms), but the mussel is more elongate and less oblique, and the hinge is different.

Type in the C. M., No. 9229; paratypes in the Museum of Zoölogy, University of Michigan.

9. *Pisidium orcasense* n. sp. Mussel of medium size, subequipartite, barely oblique, moderately and evenly inflated; outlines short oval

to nearly elliptic without any angles, except a slight, rounded one at the scutum, supero-anterior slope not, or little, marked, anterior end rather broadly rounded, posterior end rounded to subtruncate; beaks slightly behind the middle, broad, rounded, moderately projecting over the hinge-margin; surface shining to somewhat dull and with a slight silky gloss, under the microscope distinctly rugulose, with fine, irregular, somewhat sharp and crowded striae and a few slightly marked rest-lines; color pale corneous, shell thin, translucent; hinge about three-fourths the length of the mussel, slight, with a somewhat broad plate; cardinals rather small and slight, well up on the plate, the right curved with its posterior part bifid, a somewhat narrow, but deep, excavation below it; left anterior somewhat oblique, curved to angular, its edge pointed, posterior oblique, slightly curved, "covering" only a small part of the anterior; laminae slight, projecting inward but little, the right inner both with somewhat proximal, small, pointed cusps, the outer both short and small; left both with the cusps about median, small, pointed, somewhat abrupt; ligament rather short and thick. Long. 4.3; alt. 3.6; diam. 2.6 mm.

*Habitat*: Orcas Id., San Juan County, Washington. Collected by Carl C. Engberg in 1919. Type C. M., No. 9242 and seq.; paratypes in the collection of Mr. Engberg.

There were about fifty specimens in the lot, ranging from quite young to apparently mature; one mussel opened contained six nepionic young 1.5 mm. long. Some specimens are slightly more elongate, with the surface more polished, whitish to straw-color, but probably not distinct.

At first glance this *Pisidium* does not show very strongly marked features, but upon closer examination it proves peculiar as to its shape and hinge. It may be noted that the right cardinal is placed close to the edge of the valve (nymph), and this is in accord with the shortness of the left posterior, only its posterior (inferior) part being developed.

As to shape, *P. orcasense* is similar to *P. pusillum* Jenyns from Europe; whether they may be really related to each other must be ascertained later.

10. *Pisidium prognathum* n. sp. Mussel of rather small size, oblique, little elongate, rather well and evenly inflated, anterior part slightly longer and directed downward; superior part rather long,

curved, supero-anterior slope slightly curved, anterior end well below the median line, rounded angular, posterior margin subtruncate postero-anteriorly to rounded, passing into the inferior without any angle; beaks somewhat posterior, rather small, rounded, little elevated; surface dull glossy, with very fine, barely noticeable, irregular striæ, and two or three slightly marked rest-lines; color yellowish corneous, shell thin, translucent to transparent; hinge somewhat short, about three-fifths the length of the mussel, curved, rather slight, plate rather long, narrow; the right cardinal rather long, moderately, and regularly curved, its posterior part slightly thicker and grooved, both left cardinals a little oblique, rather long, nearly parallel, slightly curved, the posterior passing over the anterior for about two-thirds of its length; the right inner laminae both have the cusps rather distal, pointed, not very abrupt, both the outer laminae are small and short, or the posterior about one-third the length of the inner, both left laminae with their cusps distal, very abrupt, spine-like, with the crests somewhat rounded or truncate, inclined distalward; ligament moderately long and thick. Long. 3.2; alt. 2.7; diam. 2 mm.

Soft parts apparently of a yellowish or reddish tinge, as seen in dried specimens. One mussel was almost completely filled with about twenty-two nepionic young, about 0.8 mm. long, and in others the young could be seen through the transparent shell.

*Habitat*: A small swamp near Quamishan, Vancouver Island, British Columbia, associated with the following, all plainly identical, with slight variation as to size and shape.

11. *Pisidium pilula* n. sp. Mussel subequipartite, somewhat elongate, strongly inflated, globular; outlines of the valve-edges oval to elliptical, supero-anterior slope barely or not marked; beaks somewhat posterior, narrow, calyculate, rather well elevated and somewhat inclined backward; surface shining, with striæ very fine and slight, shallow, irregular; color pale corneous, lighter inclining to straw-color along the margins; shell thin, translucent; hinge curved, slight, plate short, narrow; cardinals quite small, short, the right slightly curved, with the posterior part abruptly much thicker, bifid; left both comparatively very short, far apart, the anterior on the edge of the hinge, with its crest pointed, the posterior oblique, barely curved, not extending over the anterior; the right inner laminae both with the beaks about median, small, pointed, bent upward, the outer anterior

quite small, vestigial, posterior nearly half as long as the inner, connate with it proximally; the left both with their cusps about median, small, very abrupt, nearly spine-like; ligament rather short and thick. Long. 3.3; alt. (over beaks) 2.9; diam. 2.7 mm.

*Habitat*: Small swamp near Quamishan, Vancouver Island, British Columbia. Collected by A. W. Hanham, sent for examination by S. S. Berry, 1919. There were only four specimens in the lot, associated with the preceding species and *P. columbianum*. They are plainly distinct and show only slight differences of shape between themselves. The mussel is so strongly and evenly inflated that a transverse section behind the beaks would be circular, or the diameter may even surpass the dorso-ventral dimension. That the beaks are calyculate is possibly due to some influence of the habitat, and specimens from other places may not show this feature. Only one specimen was opened, but its hinge appeared to be normal. In shape they are somewhat like forms of *P. medianum* Sterki, but the beaks are inclined backward, and the hinge is different. Type in the C. M., No. 9261.

12. *Sphærium declive* n. sp. In the Preliminary Catalog of the North American Sphæriidæ, p. 433, it is stated that a form of *Sphærium* was doubtfully referred to *aureum* Prime.<sup>1</sup> With more materials coming in, it became evident that the form was at least a well-marked subspecies, which I have named *declive*. A large number of good specimens from the Sheyenne River, North Dakota, collected by members of the University of Michigan in the summer of 1919, are evidently the same, and showed conclusively that this *Sphærium* is different and distinct from *aureum*.

The mussel is less elongate, the supero-anterior slope is more marked and steeper, the posterior margin is truncate or subtruncate at nearly right angles; both ends are more angular<sup>2</sup> and more ventral;

<sup>2</sup> Old specimens are often of more rounded outlines, and less characteristic; the same is true with almost all Sphæria of this group (*Cyrenastrum*), the beaks are somewhat anterior and inclined forward, and markedly narrow in the center, as is especially noticeable in half-grown and adolescent mussels, moderately large, somewhat broad, and not so

<sup>1</sup> As described and figured by T. Prime in Mon. Corb., p. 35, and shown in the rather poor specimen (valves) in his collection, not designated as type; origin: "Lake Superior?"

greatly prominent in the full-grown; the sulci are somewhat coarse and rather irregular to slight and almost obsolete; the color is lighter or darker grayish corneous. The hinge is somewhat more curved, the posterior laminæ being at a noticeable angle to the plate. It should be added that mussels taken for *aureum* are regularly and evenly rounded-inflated, while in *declivæ* the disks—*i. e.*, the middle part of the valves—are somewhat flattened. Long. 14.5; alt. 11.5; diam. 8.8 mm.

Typical specimens, well representing the species, are C. M., No. 9140, from the Sheyenne River, near Tolina, North Dakota, collected by Mina L. Winslow, July 26, 1919; other specimens of the same lot are in the collection of the Museum of Zoölogy, University of Michigan. There are also numerous specimens from Deuel County, South Dakota, collected by W. H. Over in 1896; Bates Creek, C. M. Nos. 5212, 5315, etc.; and a small creek near Clear Lake, C. M. No. 5133, etc.; the former are larger, with heavier shells and hinges; long. 16.4; alt. 12.5; diam. 10.5 mm.